CLAIMS

1. A microwave plasma processing method for introducing microwaves into a plasma processing chamber, and transforming a processing gas into plasma to form a thin film layer on a base substance disposed in the plasma processing chamber, the method characterized by:

fixing the base substance coaxially with a central axis of the plasma processing chamber;

setting a standing wave mode of the microwaves in the plasma processing chamber to a TE mode or a TEM mode from a mouth portion to a body portion of the base substance; and

setting a mode having both the TE mode and a TM mode in a bottom portion of the base substance.

2. The microwave plasma processing method according to claim 1, comprising inserting a metallic processing gas supply member into the base substance on the central axis of the plasma processing chamber so as not to reach the bottom portion of the base substance.

3. The microwave plasma processing method according to claim 1 or 2, comprising supplying the microwaves to the plasma processing chamber from a side surface of the plasma processing chamber at a position between the mouth portion and the bottom portion of the base substance.

4. The microwave plasma processing method

according to claims 1 to 3, wherein a mode of the microwaves before introduced into the plasma processing chamber is set to the TE mode and the TM mode.

5. The microwave plasma processing method according to claims 1 to 4, wherein a degree of vacuum inside the base substance is higher than a degree of vacuum outside the base substance.